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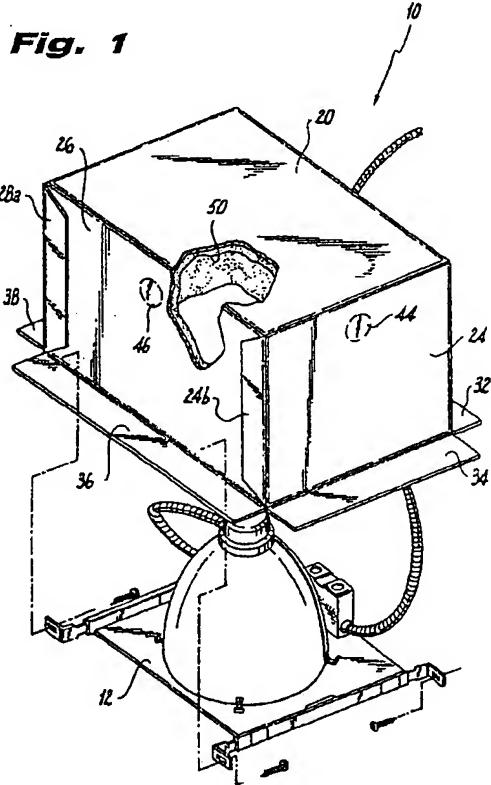
(71) Applicant: The Logic Construction Systems,
L.L.C.
Park City, Utah 84060 (US)

(72) Inventors:
• Monson, Kevin J.
Salt Lake City, Utah 84117 (US)
• Jensen, Christopher D.
Salt Lake City, Utah 84124 (US)
• Calo, Edward V.
Park City, Utah 84098 (US)

(74) Representative: Woodward, John Calvin et al
Venner Shipley & Co.
20 Little Britain
London EC1A 7DH (GB)

(54) Fire resistant lighting enclosure

(57) An enclosure (10) for use in conjunction with a recessed fixture such as a light fitting or a loudspeaker comprising a rectangular housing defining a top wall (20) and side walls (22,24,26,28), at least the interior wall surfaces of the housing being provided with a layer (50) of fire resistant material. Flanges (32,34,36,38) extend outwardly from bottom edges of side walls of the housing to facilitate mounting of the housing between spaced apart building joists.



EP 0 908 668 A2

Description

[0001] This invention relates to an enclosure for preventing the spread of fires in buildings, and more particularly, to fire resistant enclosures for recessed fixtures, such as, for example, lighting fixtures, as well as methods of fabricating and installing the same.

[0002] In residential and commercial buildings, it is commonplace to provide insulation materials between ceiling joists to reduce heat loss from the living spaces. It is also commonplace to install recessed fixtures, such as, for example, lighting fixtures and loudspeaker units, in the living spaces which include portions that extend through the ceiling between the ceiling joists. A typical twenty dwelling unit building can therefore have hundreds of recessed lighting fixtures.

[0003] It is well known that during use, recessed fixtures, and in particular recessed lighting fixtures tend to generate a significant amount of heat, and because some insulating materials utilised in residential buildings are combustible, a fire hazard generally exists. Building Regulations generally require that openings or penetrations for recessed lighting fixtures in all wood framed ceiling assemblies must be protected by a penetration firestop system. Such a system must limit the spread of fire, flame or hot gases through the firestop assembly for an acceptable period of time, when tested in accordance with a predetermined time-temperature curve set by the Regulations.

[0004] There have been attempts in the prior art to provide fire rated enclosures which isolate recessed fixtures, such as lighting and speaker units, from combustible insulation materials so as to reduce the risk of fire, and which conform with applicable building codes to prevent the spread of fire. For example, it is known in the construction industry to build a sheet rock enclosure around a recessed lighting fixture to isolate the fixture from insulation materials, and to provide a suitable firestop system for the ceiling penetration. To accomplish this, the joist space in which the lighting fixture is to be installed must first be blocked by a carpenter so that the joists can carry the sheet rock enclosure. The sheet rock is then attached to the joists and sealed. This prior art method is extremely labour intensive and very costly.

[0005] An example of an insulation barrier constructed from a plurality of panels fabricated from a fire-proof material such as Portland cement reinforced with asbestos fibers, and joined together by clips is disclosed in US patent No. 4237671. The prefabricated panels are dimensioned to accommodate different joist spacings, but they must be constructed at the building site for utilization. Examples of preformed insulation barriers constructed from aluminium sheet metal are disclosed in US patents Nos. 4375142 and 4400766. Both of these devices include perforations to facilitate construction, and therefore they do not provide a firestop system which conforms with applicable building codes. Furthermore, aluminium sheet metal is a relatively expensive materi-

al, and its usage adds significantly to the cost of construction. Clearly, there is a need in the art for an inexpensive preformed insulation barrier which conforms with the firestop requirements of applicable building codes.

[0006] The present invention is directed to a preformed fire resistant enclosure for recessed fixtures employed in residential and commercial buildings which conforms with applicable building codes relating to firestop systems for ceiling/floor penetrations. In the specification which follows, the fire resistant enclosure of the invention is described and illustrated in relation to a recessed lighting fixture. However, those skilled in the art will readily appreciate that it is suitable for use in conjunction with other recessed fixtures, such as, for example, loudspeaker units.

[0007] The preferred enclosure includes a housing formed from common sheet metal, such as, for example, 26 gauge sheet metal, or a similar inexpensive readily available material. The preferred housing is defined by a top wall and first through fourth side walls. The top wall and side walls have exterior and interior wall surfaces, and at least the interior wall surfaces of the enclosure have a fire resistant material provided thereon. It is envisaged that the fire resistant material may also be provided on the exterior surfaces of the enclosure to further enhance its fire suppression characteristics.

[0008] Generally planar flanges preferably extend outwardly from edges of the side walls of the housing to facilitate mounting of the housing between spaced apart building joists. Preferably, the first and third side walls of the housing are opposite one another and are dimensioned to facilitate mounting of the housing between joists spaced at 12.0 inch centres, and the second and fourth walls of the housing are opposite one another and are dimensioned to facilitate mounting of the housing between joists spaced at 16.0 inch centres. Thus, the fire resistant enclosure of the subject invention is readily adaptable to different joist spacings. Those skilled in the art will readily appreciate that the dimensions of the housing can be modified to accommodate other joist spacings.

[0009] Each of the side walls of the enclosure are preferably provided with an aperture to accommodate the passage of electrical wires associated with a lighting fixture. The apertures may be defined by perforated knock-outs which can be selectively opened to accommodate wiring. Preferably, the fire resistant material associated with the interior surfaces of the lighting enclosure is selected from a group of fire resistant materials consisting of cementitious and intumescent materials. Such materials are commercially available in a wide variety of forms including coatings, films or sheetings, and can be applied by spraying, rolling, brushing or other similar methods known in the art.

[0010] The invention is also directed to a method of installing recessed fixtures. This method includes the steps of providing a housing configured to enclose a re-

cessed fixture, providing at least interior surfaces of the housing with a fire-resistant material, and mounting the housing between spaced apart building joists. Preferably, the step of providing surfaces of the housing with a resistant enclosure precedes the step of mounting the housing between spaced apart building joists. Although, it is envisaged that at least interior surfaces of the enclosure may be provided with the fire resistant material after the enclosure has been mounted between spaced apart joists.

[0011] The method further includes the steps of placing a fixture within the housing, passing electrical wires through an aperture formed in at least one side wall of the housing, and sealing the aperture after passing the electrical wires therethrough. The method also includes the step of positioning the enclosure in a first orientation for mounting between building joists spaced at 12.0 inch centres, or positioning the enclosure in a second orientation for mounting between building joists spaced at 12.0 inch centres.

[0012] These and other features of the invention will become more readily understood from the following detailed description thereof, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a lighting enclosure of the invention, sectioned to illustrate the fire resistant material provided on the interior surfaces thereof, and further illustrating the recessed lighting fixture which the enclosure is configured to house; Figure 2 is a top plan view of the stamped sheet metal blank from which the lighting enclosure illustrated in Figure 1 is constructed;

Figure 3 illustrates the manner in which the stamped sheet metal blank illustrated in Figure 2 is folded to form the enclosure of Figure 1;

Figure 4 is a perspective view of a lighting enclosure of the invention as oriented during installation between two adjacent ceiling joists;

Figure 5 is a side elevational view in cross section of the lighting enclosure of the invention mounted in a first orientation between ceiling joists spaced at 12.0 inch centres; and

Figure 6 is a side elevational view in cross section of the lighting enclosure of the invention mounted in a second orientation between ceiling joists spaced at 16.0 inch centres.

[0013] Referring now in detail to the drawings wherein like reference numerals identify the same or similar parts, there is illustrated in Figure 1 a fire rated lighting enclosure designated generally by reference numeral 10. Lighting enclosure 10 has a generally rectangular box-like configuration which encloses a conventional recessed lighting fixture 12 when installed between adjacent ceiling joists, as shown for example in Figures 5 and 6. Once installed, the fire rated lighting enclosure 10 provides a lightweight, durable, readily adaptable

structure which advantageously isolates a heat generating recessed lighting fixture 12 from combustible insulation material adjacent thereto, and prohibits the propagation of fire through the ceiling penetration associated with the lighting fixture in conformance with applicable building codes.

[0014] Referring to Figure 1 in conjunction with Figure 2, lighting enclosure 10 is constructed from a blank which is stamped from conventional 26 gauge sheet metal, expanded metal, metal mesh, or similar inexpensive material. Enclosure 10 includes a top wall 20 and first through fourth side walls 22, 24, 26 and 28. The first and third side walls 22 and 26 are opposite one another and have a greater lengthwise dimension than the opposed second and third side walls 24 and 28. More particularly, the lengthwise dimension of the first and third side walls 22 and 26 is selected to facilitate mounting of the lighting enclosure 10 between ceiling joists spaced 16.0 inch centres, as illustrated in Figure 6, while the lengthwise dimension of the second and fourth side walls 24 and 28 is selected to facilitate mounting of the lighting enclosure 10 between ceiling joists spaced at 12.0 inch centres, as illustrated in Figure 5.

[0015] The second and fourth side walls 24 and 28 are each provided with opposed lateral tabs 24a and 24b, and 28a and 28b, respectively. These lateral tabs are configured for attachment to the first and third side walls 22 and 26 to facilitate construction of the enclosure 10, as shown for example in Figure 3. Those skilled in the art will readily appreciate that the lateral tabs could alternatively be provided on the first and third side walls 24 and 28. The tabs are preferably secured to the first and third side walls of the enclosure by spot welding or a similar metal joining technique well known in the art. Other methods of joining the side walls are also envisioned; such as, for example, welding or securement with fasteners and brackets.

[0016] Mounting means are provided on each of the four side walls of enclosure 10 and include flanges 32, 34, 36 and 38 which depend outwardly from the bottom edges of the first through fourth side walls 22, 24, 26 and 28, respectively. The first through fourth side walls of lighting enclosure 10 are each provided with an aperture for accommodating electrical wires of a recessed lighting fixture enclosed thereby. These include apertures 42, 44, 46 and 48 which are preferably stamped through the side walls, but which in the alternative, may be provided as perforated knock-outs, a concept that is common in the construction industry.

[0017] As best seen in Figure 1, the interior surfaces of lighting enclosure 10 are provided with a layer or covering material, designated generally by reference numeral 50, which is intended to prevent the propagation of fire. The material 50 is selected from a group of fire resistant materials including cementitious and intumescent materials, or other tested and approved materials. Cementitious fire proofing materials are inorganic materials that are supplied as a powder which is mixed with

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water and sprayed on surfaces, such as the interior of enclosure 10, in a thickness and density required to achieve fire resistant ratings in accordance with known building codes. Typically, the hourly fire rating for such materials will vary from one to four hours depending upon the applied thickness or number of material layers. In a preferred embodiment of the invention, such a material is applied with a thickness of about 0.0625 inches to about 1.50 inches. A suitable cementitious fire proofing material is marketed under the tradename PYRO-LITE 15/RETRO-LITE 15 which is manufactured and sold by CarboLine Fireproofing Products Division, of St. Louis, Missouri.

[0018] Intumescent fireproofing materials form a passive fire protection which remains inactive until subjected to levels of heat when the material expands. Thin film intumescent coatings having a thickness of about 0.0125 inches which may be brushed, rolled or sprayed on steel surfaces are marketed under the tradename Cafco and are available from Isolatek International of Stanhope, New Jersey. Intumescent composite sheeting materials are also available from 3M Corporation of St. Paul, Minnesota. These sheets may be cut to desired dimensions and provided with blank openings or penetrations to conform to the geometry of lighting enclosure 10.

[0019] In accordance with a preferred embodiment of the invention, the fire resistant material is applied to the interior wall surfaces of lighting enclosure 10 during fabrication, i.e. prior to installation between two spaced apart ceiling joists. However, it is envisaged within the scope of the invention that the fire resistant material may be applied to the interior wall surfaces of the lighting enclosure after it has been installed between two spaced apart ceiling joists. It is also envisaged that fire resistant coating materials may be applied to the exterior wall surfaces of the lighting enclosure 10, as shown for example in Figures 5 and 6.

[0020] Referring now to Figure 4, to install the fire rated lighting enclosure 10 of the invention in a first orientation between two ceiling joists spaced 12.0 inch centres, mounting flanges 32 and 36 are employed. Conventional screw-type fasteners 60 are utilized to secure the mounting flanges to the lower chords of two spaced apart ceiling joists 62 and 64. Those skilled in the art will readily appreciate that alternative types of fasteners may be employed to secure the mounting flanges to the ceiling joists.

[0021] Once the lighting enclosure 10 is properly installed between the two spaced apart joists, a recessed lighting fixture 20 is placed therein and secured in a conventional manner utilizing threaded fasteners or the like. Thereafter, a selected one of the apertures 44 formed in the walls of the enclosure is knocked-out to accommodate electrical wiring 16 associated with lighting fixture 12. A suitable fire-proofing material, such as an intumescent or cementitious material, can then be applied in the area of the wire penetrated aperture to seal the

interior of the enclosure, and thereby isolate the lighting fixture 12 from the insulating material 66 disposed between joists 62 and 64.

[0022] Thereafter, as illustrated in Figure 5, a piece of material 66 is attached to joists 62 and 64 in a conventional manner to define the ceiling of the building construction and a penetration 68 for the recessed lighting fixture mounted thereabove. As illustrated in Figure 6, when lighting enclosure 10 is installed between two ceiling joists 72 and 74 spaced at 16.0 inch centres, it is disposed in a second orientation in which the opposed mounting flanges 34 and 38 are employed to secure the enclosure to the lower chords of two spaced apart ceiling joists.

[0023] Although the invention has been described in conjunction with recessed lighting fixtures, those skilled in the art will readily appreciate that it is also suitable for use in conjunction with other recessed fixtures, such as, for example, recessed loudspeakers.

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Claims

1. An enclosure (10) for a recessed fixture comprising:

25 a housing with means thereon for mounting said housing between spaced apart building joists, characterised in that at least said interior wall surfaces of the housing have a layer (50) of fire resistant material provided thereon.

30 2. An enclosure as claimed in claim 1 characterised in that the housing has first and third side walls (22,26) which are opposite one another and dimensioned to facilitate mounting of said housing between building joists spaced apart by a first predetermined distance.

35 40 3. An enclosure as claimed in claim 1 characterised in that the housing has second and fourth walls (24,28) which are opposite one another and are dimensioned to facilitate mounting of said housing between building joists spaced apart by a second predetermined distance.

45 4. An enclosure as claimed in any preceding claim characterised in that each side wall of the housing is provided with an aperture (44) to accommodate the passage of electrical wires therethrough.

50 5. An enclosure as claimed in any preceding claim characterised in that said mounting means comprises flanges (32,34,36,38) depending from the bottom edges of side walls of the housing.

55 6. An enclosure as claimed in any preceding claim characterised in that the exterior wall surfaces of

said enclosure have a layer (50) of fire resistant material provided thereon.

7. An enclosure as claimed in any preceding claim characterised in that the fire resistant material (50) is applied to said enclosure in such a manner so as to provide a firestop system which conforms with applicable building codes. 5
8. An enclosure as claimed in any preceding claim characterised in that the fire resistant material (50) is selected from a group consisting of cementitious and intumescent coating materials. 10
9. A method of installing recessed fixtures comprising the steps of 15
 - a) providing a housing configured to enclose a recessed fixture
 - b) providing at least the interior surfaces of said housing with a layer (50) of a fire resistant material and
 - c) mounting said housing between spaced apart building joists
10. The method of claim 9 characterised in that the step of providing at least interior surfaces of said housing precedes the step of mounting the housing between spaced apart building joists. 20 25
11. The method of claim 10 further comprising the step of placing a lighting fixture within said housing.
12. The method of claim 9 further comprising the step of passing electrical wires through an aperture (44) formed in at least one side wall of said housing. 35
13. The method of claim 12 further comprising the step of sealing said aperture subsequent to the step of passing electrical wires therethrough. 40
14. The method of claim 9 further comprising the step of positioning said enclosure in a first orientation for mounting between building joists spaced apart at a first predetermined distance. 45
15. The method of claim 14 further comprising the step of positioning said enclosure in a second orientation for mounting between building joists spaced apart at a second predetermined distance. 50

Fig. 1

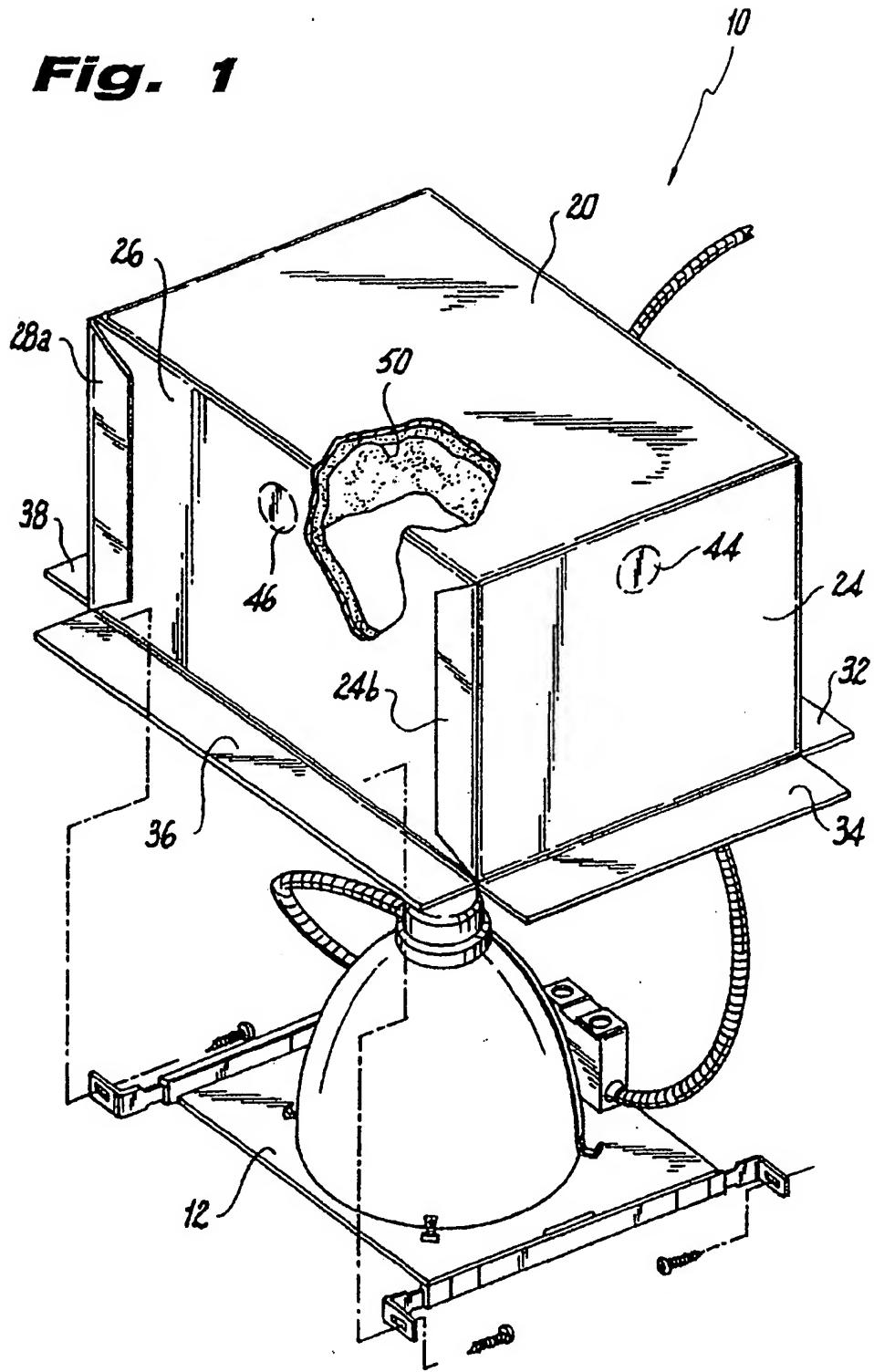


Fig. 2

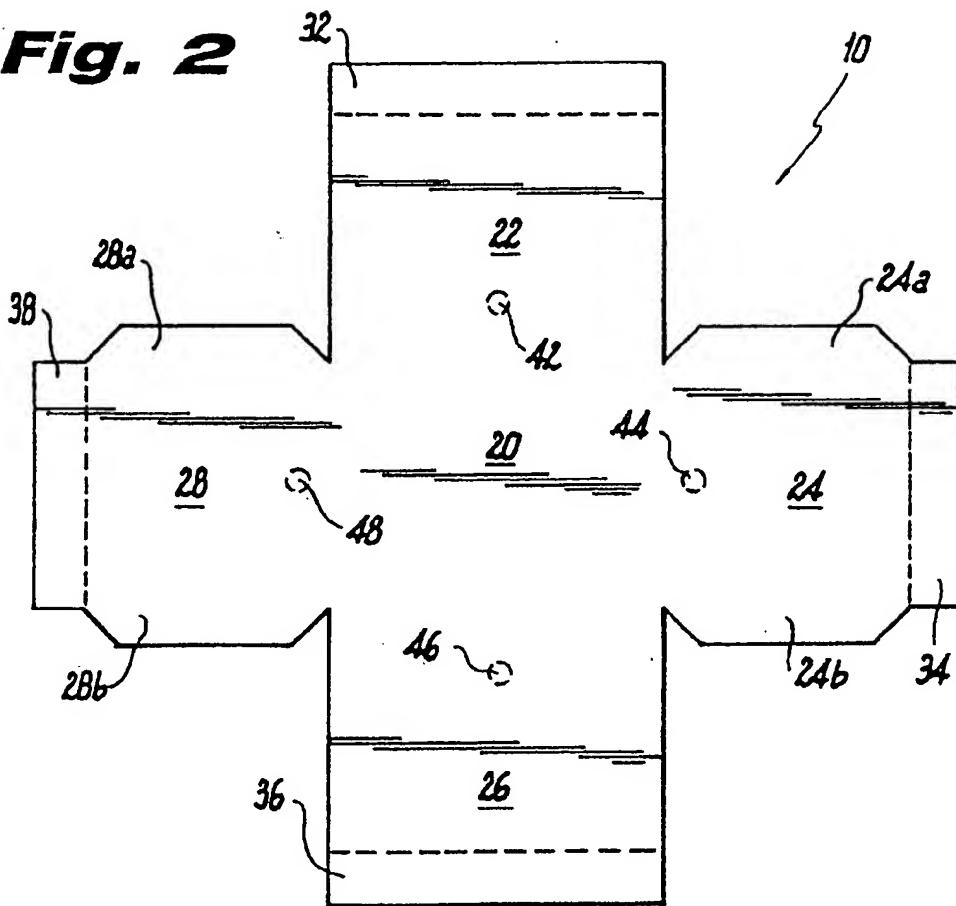
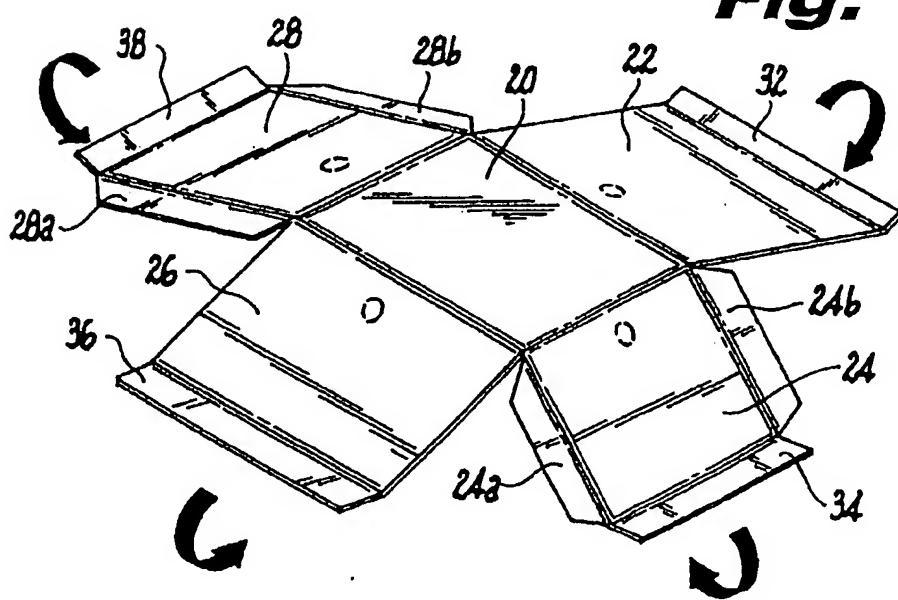


Fig. 3



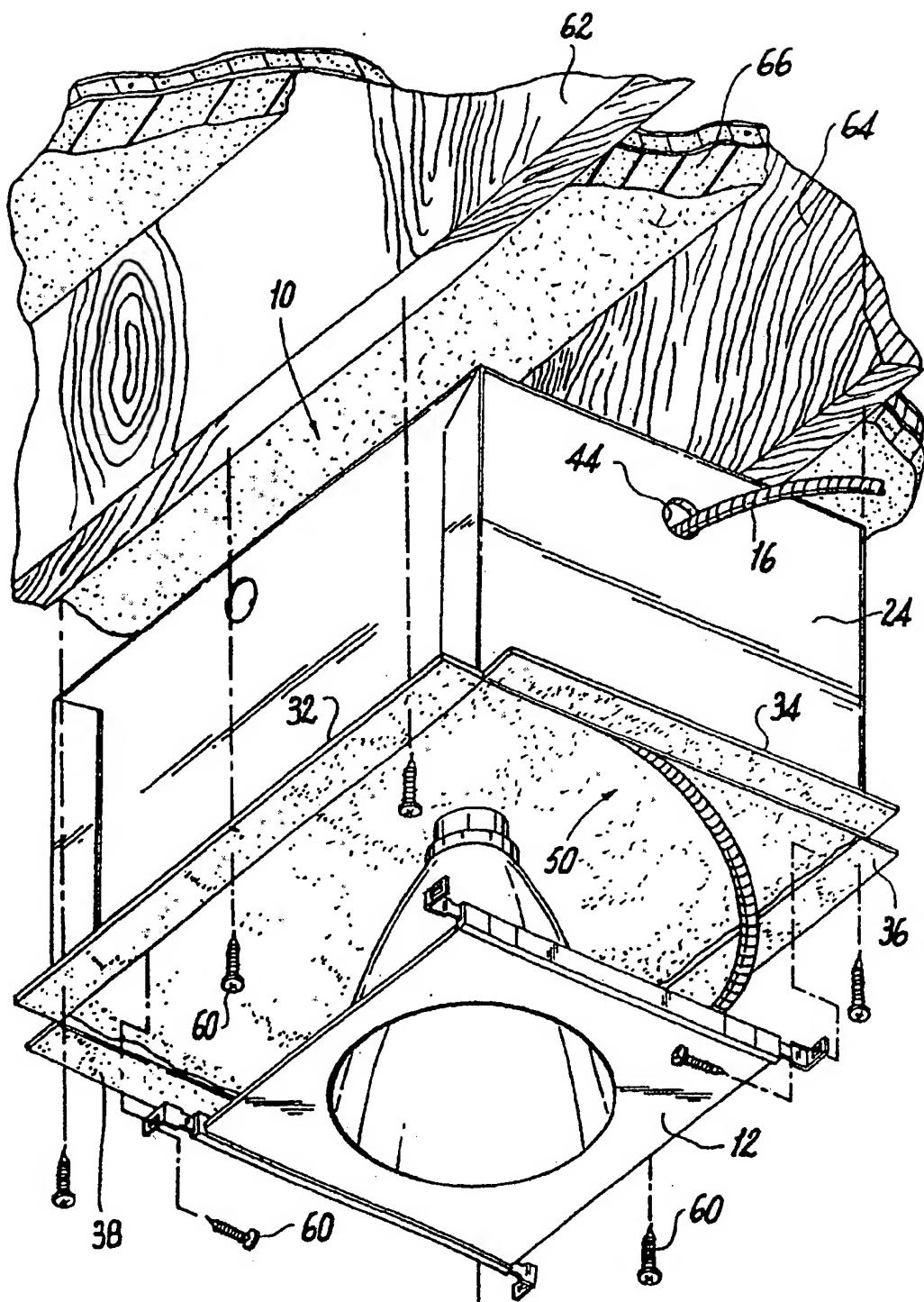


Fig. 4

Fig. 5

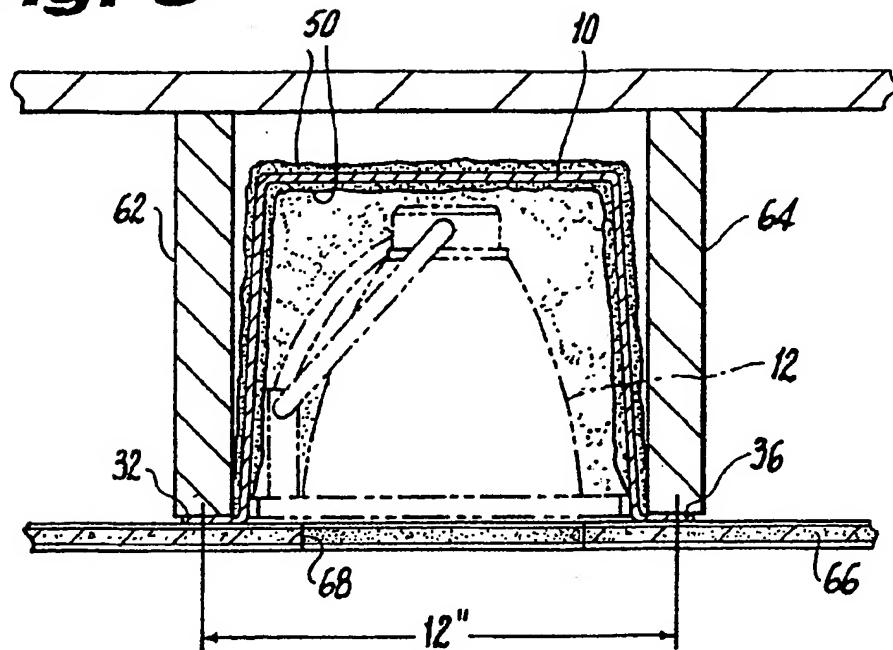
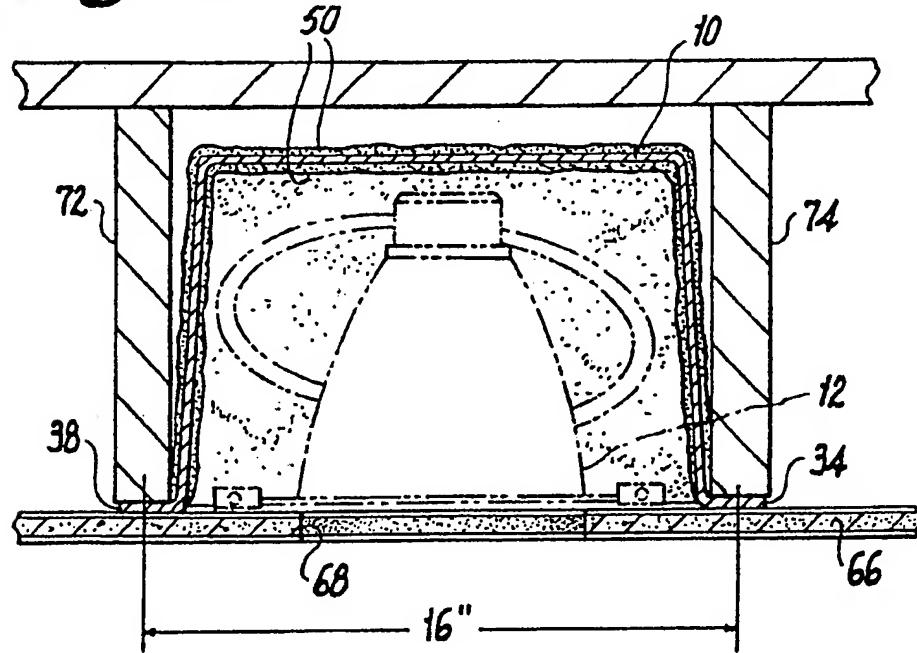


Fig. 6





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(71) Applicant: The Logic Construction Systems,
L.L.C.
Park City, Utah 84060 (US)

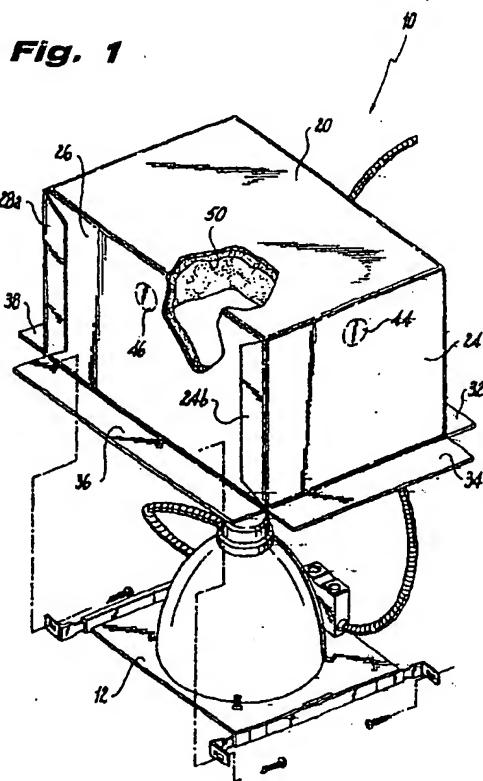
(72) Inventors:

- Monson, Kevin J.
Salt Lake City, Utah 84117 (US)
- Jensen, Christopher D.
Salt Lake City, Utah 84124 (US)
- Calo, Edward V.
Park City, Utah 84098 (US)

(74) Representative: Woodward, John Calvin et al
Verner Shipley & Co.
20 Little Britain
London EC1A 7DH (GB)

(54) Fire resistant lighting enclosure

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EP 0 908 668 A3



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EUROPEAN SEARCH REPORT

Application Number
EP 98 30 7487

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.)						
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<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 33%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>3 August 1999</td> <td>De Mas, A</td> </tr> </table> <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background D : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>				Place of search	Date of completion of the search	Examiner	THE HAGUE	3 August 1999	De Mas, A
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ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 98 30 7487

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